REMARKS

Claims 37-41 are amended. Claims 42-53 are added. Claims 37-53 are pending in the application.

Claims 37 and 41 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Segal, U.S. Patent No. 5,513,512. The Examiner is reminded by direction to MPEP § 2131 that anticipation requires each and every limitation of a claim to be disclosed in a single prior art reference. Claims 37 and 41 are allowable over Segal for at least the reason that Segal fails to teach each and every limitation in either of those claims.

As amended, each of independent claims 37 and 41 recite providing a cast material, performing a preliminary treatment comprising at least one of homogenizing, hot forging and solutionizing. Claims 37 and 41 additionally recite after the preliminary treatment, defining equal channel angular extrusion (ECAE) routes and passing the cast material through at least one of the defined routes. The amendments to claims 37 and 41 are supported by the specification at, for example, page 2, lines 13-17; page 2, lines 22-26; page 2, lines 32-35; page 5, line 33 through page 6, line 32. Segal discloses plastic deformation utilizing equal channel angular extrusion which can include subjecting the workpiece to a number of passes using one or more orientations of the workpiece. Segal does not disclose or suggest the claim 37 and 41 recited performing a preliminary treatment comprising at least one of homogenizing, hot forging and solutionizing, prior to equal channel angular extrusion. Accordingly, independent claims 37 and 41 are not anticipated by Segal and are allowable over this reference.

Claims 38-40 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Segal in view of "Stress-Relief Heat Treating of Steel". The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness rejection has the following three

requirements: 1) there must be some suggestion or motivation to modify or combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Independent claims 38-40 are allowable over the cited combination of Segal and "Stress-Relief Heat Treating of Steel" for at least the reason that the references, individually or as combined, fail to disclose or suggest each and every limitation in any of those claims.

With respect to independent claims 38 and 39, as amended such recite performing a preliminary treatment comprising subjecting a cast material to at least one of homogenizing, hot forging and solutionizing, and subsequently processing the alloy through a selected route of equal channel angular extrusion. As discussed above with respect to independent claims 37 and 41, Segal does not disclose the recited preliminary treatment comprising at least one of homogenizing, hot forging and solutionizing. Further, Segal does not suggest the recited preliminary treatment comprising at least one of homogenizing, hot forging and solutionizing, prior to ECAE processing and claims 38 and 39 are therefore not rendered obvious by Segal.

"Stress-Relief Heat Treating of Steel" discloses heat treating of steel to relieve residual stresses that remain in a structure after manufacturing processes. "Stress-Relief" does not disclose or suggest the claims 38 and 39 recited preliminary treatment of cast material using at least one of homogenizing, hot forging and solutionizing. Additionally, "Stress-Relief" does not disclose or suggest the claim 38 and claim 39 recited ECAE processing after the preliminary treatment. As combined, Segal and "Stress-Relief" fail to disclose or suggest the claims 38 and 39 recited preliminary treatment of a cast material using at least one of homogenizing, hot forging and solutionizing, followed by processing by equal channel angular extrusion. Accordingly, independent claims 38 and 39 are not

rendered obvious by the cited combination of Segal and "Stress-Relief" and are allowable over these references.

As amended independent claim 40 recites processing a cast material comprising an alloy by performing at least one pass through a selected equal channel angular extrusion route, and subsequently intermediate annealing the alloy followed by at least one additional pass through the equal channel angular extrusion route. The amendment of claim 40 is supported by the specification at, for example, page 9, line 29 through page10, line 5; page 10, line 25 through page 11, line 2; and page 22, line 5 through page 23, line 31. Neither Segal nor "Stress-Relief" disclose or suggest the claim 40 recited intermediate annealing between extrusion passes. As combined, Segal and "Stress-Relief" fail to disclose or suggest the claim 40 recited performing at least one pass through a selected equal channel angular extrusion route followed by intermediate annealing and at least one subsequent pass through the selected equal channel angular extrusion route. Accordingly, independent claim 40 is not rendered obvious by the cited combination of Segal and "Stress-Relief" and is allowable over these references.

Claims 42-53 do not add "new matter" to the application since each is fully supported by the specification as originally defined. Claims 42-53 are supported by the specification at, for example, page 8, lines 8-11; page 9, line 9 through page 10, line 5; page 10, line 20 through page 11, line 4; table 2; and page 22, line 5 through page 23, line 31.

For the reasons discussed above claims 37-41 are allowable and claims 42-53 are believed allowable. Accordingly, applicant respectfully requests formal allowance of claims 37-53 in the Examiner's next action.

Respectfully submitted,

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Attorney's Docket No. 30-5004 div2
Title: Methods For Controlling The Texture Of Alloys Utilizing Equal Channel Angular Extrusion

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING RESPONSE TO OCTOBER 24, 2002 OFFICE ACTION

In the Claims

The claims have been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

37. (Amended) A method for controlling the texture of a cast material alloy, comprising the steps of:

providing a cast material comprising an alloy;

performing a preliminary treatment comprising subjecting the cast material to at least one of homogenizing, hot forging and solutionizing;

after the performing the preliminary treatment, defining equal channel angular extrusion routes for defining predetermined shear planes and crystallographic directions in the alloy;

selecting at least a route from the defined routes for plastically deforming the alloy during equal channel angular extrusion; and

subjecting the alloy to a predetermined number of passes through the selected routes.

38. (Amended) A method for controlling the texture of a cast material alloy, comprising the steps of:

providing a cast material comprising an alloy;

performing a preliminary treatment comprising subjecting the cast material to at least one of homogenizing, hot forging and solutionizing;

after the performing the preliminary treatment; defining equal channel angular extrusion routes for defining predetermined shear planes and crystallographic directions in the alloy;

selecting at least one route from the defined routes for processing the alloy;

processing the alloy through the selected at least one route; and

recovery annealing the alloy at a temperature range and a time period determined for the alloy for obtaining substantially uniform grain size, global microstructure and texture.

39. (Amended) A method for influencing the texture evolution of a cast material alloy, comprising the steps:

providing a cast material comprising an alloy;

performing a preliminary treatment comprising subjecting the cast material to at least one of homogenizing, hot forging and solutionizing;

after the performing the preliminary treatment, defining equal channel angular extrusion routes for defining predetermined shear planes and crystallographic directions in the alloy;

selecting at least one route from the defined routes for processing the alloy;

processing the alloy through the selected at least one route;

recovery annealing the alloy at a temperature range and a time period determined for the alloy; and

further recovery annealing the alloy at a temperature greater than maximum temperature of the temperature range.

40. (Amended) A method for controlling the texture of a cast material alloy, comprising the steps of:

providing a cast material comprising an alloy;

defining equal channel angular extrusion routes for defining predetermined shear planes and crystallographic directions in the alloy;

selecting at least one route from the defined routes for processing the alloy;

processing the alloy by performing at least one pass through the selected at least one route;

after the processing, intermediate annealing the alloy;

after the intermediate annealing, performing at least one additional pass through the selected at least one route; and

post-extrusion processing the alloy to create a specific texture, a uniform grain size and a high texture strength for the alloy.

41. (Amended) A method for controlling the texture of a cast material alloy, which comprises the steps of:

providing a cast material comprising an alloy;

performing a preliminary treatment comprising subjecting the cast material to at least one of homogenizing, hot forging and solutionizing;

after the performing the preliminary treatment, defining equal channel angular extrusion routes for defining predetermined shear planes and crystallographic directions in the alloy;

selecting at least one route from the defined routes for processing the alloy;

processing the alloy through the selected at least one route; and

further processing the alloy under equal channel angular extrusion in order to create a specific texture, a uniform grain size and a high texture strength for the alloy.

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